A REVIEW OF THE FAIRNESS OF THE COMPARATIVE VALUE PRICING SYSTEM

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EXECUTIVE SUMMARY

THE COMPARATIVE VALUE PRICING SYSTEM

The Comparative Value Pricing system (CVP) clearly has the potential to be more "fair" than either of its predecessors, the Modified Rothery system, or the Export Tax plus Rothery system. All licensees have an equal opportunity for profit, independent of the quality and location of the timber harvested. Competition is now on the basis of efficiency, not on who harvests the best or most accessible timber. However the CVP, as did its predecessors, still depends on accurate appraisals to deliver on its promise.

Many licensees like the "level playing field" effect of the CVP, but believe the amount charged is excessive. Nearly all objected to the "waterbed effect" inherent in the system, as an impediment to necessary change. There are more complaints about appraisal policies within the CVP, and many more complaints about appraisal detail. Most of the complaints relate to the policies and methods of estimating selling prices and costs, which were essentially the same under the predecessor systems of setting prices for timber. Thus the complaints do not indicate failure of the CVP concept.

One significant minority group believes the CVP is badly flawed and must be replaced by a return to the Export Tax system. That group felt that it had been discriminated against in some fashion by the system, and presented comparisons of appraised stumpage to show this. Our review found that the Export Tax failed the basic test of recognizing differences in the value of the timber; and, that the differences in the appraisals are an attempt to reflect real operating conditions, and are not evidence of discrimination.

The fairness of the CVP in practice, rather than in the theoretical concept was tested in two ways:

> The distribution of changes in the stumpage costs and profitability of a sample of mills grouped by type of mill and biogeoclimatic zone was examined. This review showed that, broadly measured, the CVP accomplishes its objective of recognizing the diversity of the forest

resource and the variability in operating costs and product values, in establishing the value of a stand of timber.

Stumpage rates of January 1990 were compared with those of 1979, the last time stumpages were generally above minimum levels. The pattern of stumpage rates under the CVP is very similar to what would have been generated under Rothery in those periods when most timber was appraised above minimums. While the Rothery system only recognized the differences at high product prices, the CVP maintains the differential under all market conditions.

These results indicate that, in practice, the broad impact of the CVP is fair, and that any inequities relate to problems with appraisals, rather than with the CVP concept.

APPRAISALS

Problems with specific elements of the appraisal were beyond the scope and time limits of this report, but a number of aspects of an "administrative policy" nature which may distort the inherent fairness of the CVP were examined and are commented on.

The **"half-cap"** is an inequitable shifting of the burden from one group to another. If no technical reasons can be found to show why appraised stumpages are "too high" relative to others, then the cap should be eliminated when the 1988-1989 cost data is incorporated into appraisals.

Despite the **waterbed effect**, the CVP is still more equitable than either of its predecessor systems.

The **minimum stumpage rate of $0.25 per m^3** is "more fair" than a higher rate, although the setting of minimums has little to do with fairness among licensees and more to do with the trade-off between direct and indirect revenue generation for the Crown.

Averaging negative and positive stumpages over larger cutting permit areas would shift stumpage rates among licensees. Fairness lies in all licensees

being subject to consistent administrative policies, which exist independently of the valuation system.

Point of appraisal has a significant impact in the equitable treatment of licensees, and should be re-examined. There were many suggestions that the system should be improved, but no consensus recommendation. This review finds the population centre concept preferable and appealing in its simplicity, if the appropriate centers can be determined by objective measures, and the policy can be applied fairly in all regions.

Producers of other products (e.g. plywood) which were not affected by the Export Tax now pay the same rate of stumpage as sawmills. The treatment they receive is as fair as to any other licensee. Any concerns about the impact on these users should be remedied through appropriate industrial or social policy actions, and not through the timber pricing system.

The **"stud concession"** on logs consumed by stud mills will end in September 1990. The concession represented a departure from appraisal principles and should end as scheduled. The disadvantage to the stud mills should be ameliorated if the recommendations in this report on AMV determination are implemented.

Average Market Values for lumber, as collected for use in appraisals, were the subject of several recommendations for change. This review recommends re-examination of current practices regarding freight and weight adjustments, exclusion of non-ALS/CLS export shipments, and consideration of methods of recognizing price differences between "wides" and "narrows" in each species grouping, in order to ensure fairness among licensees.

Chip AMVs were subject to much criticism, but the situation is changing rapidly and will become even more complex. This report makes no specific recommendation, as any would soon become obsolete.

One zone for milling cost and overhead estimates was recommended by some. There are sound reasons why there should be differences in the cost of these elements, and the zones merely compensate for the inability to establish the

relationships which contribute to the differences. Until these relationships have been determined, or until the latest cost surveys fail to support the zonal concept, then the separate zones should be retained.

Linkages, or a model of the relationships from the timber cruised through to the value of the end product, would contribute to more accurate and equitable appraisals, in the opinion of most licensees. Such linkages could also simplify the appraisal process, as under the CVP, only relative values are necessary to vary stumpage rates from the target average rate, in order to provide equity among licensees. This review concludes that computer programs for enhancing lumber recovery in sawmills may provide a model for linking the value of the end product to timber cruise data. Establishing appraisals based on an internally consistent model of linkages may be the only hope for maintaining equitable appraisals in the CVP or any other system, and coping with an accelerating rate of change and increasing diversity in the lumber industry.

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INTRODUCTION

In response to allegations by several interior companies that their stumpage rates are unfair, and that the system for determining interior rates is inequitable, the Ministry of Forests (MoF) commissioned H & W Saunders Associates Ltd. to:

> determine if the Comparative Value Pricing system (CVP) in the Interior of British Columbia provides equity among licensees in achieving the objectives set out for the system.

The scope of the study included:

> a review of the objectives set for the system.
>
> a review of the recent evolution of the stumpage system in the interior, from Modified Rothery (Rothery) through Rothery plus export tax (Export Tax system), to the current Comparative Value Pricing (CVP) system.
>
> a review of MoF files of submissions from licensees on perceived inequities.
>
> interviews with and submissions from representatives of Interior licensees. Approximately 71 individuals representing 34 licensees were interviewed or submitted their views, as groups, and/or as individual operators.
>
> a review of available financial data to see if results are consistent with the objectives and expectations of the CVP system. These data were provided by Price Waterhouse Associates which was engaged by the MoF to prepare masked financial data on stratified samples of Interior companies, for 1986, 1987 and 1988.

The study was restricted to the Interior only, and was not to address the overall level of interior stumpage rates, but to focus on the fairness of the system.

OBJECTIVES OF THE COMPARATIVE VALUE PRICING SYSTEM

Under the Ministry of Forests Act, the purposes and functions of the Ministry include, in addition to resource management:

> to encourage a vigorous, efficient and world competitive timber processing industry in British Columbia; and,
>
> to assert the financial interest of the Crown in its forest and range resources in a systematic and equitable manner.

When the Comparative Value Pricing system (CVP) was introduced, the "financial interest of the Crown", as evidenced by stumpage rates for the Interior of British Columbia, was set at an average of $8.59 per cubic metre ($m^3$), later to be adjusted for subsequent changes in the appropriate Statistics Canada price index for lumber. This rate does not apply to timber sold under competitive bid. The commitment to an average rate is referred to in the 1987 Addendum (the Addendum) to the 1986 Memorandum of Understanding (MOU) between Canada and the United States, which resulted in withdrawal of the countervailing duty action and of the subsequent Federal export tax on Canadian softwood lumber shipped to the U.S.A. In 1987, the Province also required that licensees accept the cost of forest renewal, from restocking the site through to the "free to grow" stage.

In 1988, the MoF agreed that the underlying principles for an acceptable timber pricing system include:

> **Equity**
> The timber pricing system must be equitable to both the supplier (Crown) and to the buyer (Industry) and among licensees. It must recognize the diversity of British Columbia's forest resource and the variability in operating costs and product values in establishing the value of a stand of timber.

Industry viability

The timber pricing system must recognize the need for, and provide the opportunity for, the forest industry to earn an adequate return on its invested capital over the long term.

Market Sensitivity

The British Columbia forest industry competes in cyclical competitive markets. The price fluctuations caused by changing supply and demand or by fluctuating currency values are not controlled by industry. The timber pricing system must be market sensitive.

Predictability

The ability to predict costs and revenues is critical to the successs of any enterprise, industry or government. A predictable timber pricing system will encourage confidence and investment in the forest industry.

Integrity

The timber pricing system must retain its integrity over time and be founded on both fundamental economic principles and sound technical information.

BACKGROUND TO THE CVP

MODIFIED ROTHERY SYSTEM

From its introduction in 1948 until the MOU, British Columbia relied on the Modified Rothery system of stumpage appraisals to price its timber. After 1972, in the Interior of British Columbia that system determined stumpage rates by deducting from average sales value of lumber and chips, allowances for costs of an average efficient operator and a percentage margin for profit and risk, to arrive at stumpage rates. Stumpage rates were allowed to vary within a range constrained by minimum rates and, at times, by maximums. The profit margin allowance was usually under attack by industry as inadequate, and not based on sound technical analysis. "Encouragement of an efficient industry" depended on neutrality in the system, so that efficient operators could survive and ultimately replace the inefficient.

EXPORT TAX SYSTEM

In late 1986, the 15% export tax on all shipments of softwood lumber to the United States was superimposed on the Rothery system, under the terms of the MOU.

COMPARATIVE VALUE PRICING SYSTEM

When the CVP was introduced, it replaced the Export Tax plus Rothery-determined stumpage with what is essentially a fixed rate stumpage, indexed to lumber prices, and varied among areas to reflect differences in timber quality and operating costs. The "financial interest of the Crown" is now as determined by the Addendum, and the "encouragement of an efficient industry" still depends primarily on the neutrality of the system. In short, the mandate of the MoF remains unchanged, but the "Financial interest of the Crown" is now defined as a specific average stumpage rate plus the transference of forest renewal costs to licensees.

The MoF developed the CVP as a replacement for the export tax plus stumpage in an attempt to restore the equity aspects of the Rothery system. In doing so, the Crown shifted market risk back on to the producers, by imposing a nearly flat rate schedule, varied to reflect differences in timber values, similar to that in other provinces. Shifting market risk to the licensee increases the

risk of mill closures in weak markets, with attendant social consequences, but this is also the situation in other provinces. The likelihood of closures is a function of the change in the industry's costs relative to those of its competitors; a subject beyond the scope and terms of reference of this review.

In the trade-offs to achieve equity, predictability is lessened under the CVP since a shift in one area to logging timber of different value changes the Mean Value Index for the Interior, and thereby changes the stumpage on all licensees in the Interior. This "waterbed" effect becomes evident in the subsequent explanation of the mathematics of the CVP system. Predictability will improve as licensees return to logging the timber profile, and as technical aspects of the appraisal are brought up to date, and stabilize.

The following tabular analysis summarizes the performance of the three systems in following the principles for achieving an acceptable pricing system.

COMPARISON OF THE STUMPAGE SYSTEMS IN FOLLOWING THE "PRINCIPLES FOR AN ACCEPTABLE PRICING SYSTEM"

PRINCIPLES	ROTHERY	EXPORT TAX	CVP SYSTEM
Equity - Crown vs Industry	no explicit determination	same	same
- among Licensees	neutral under high lumber prices	failed to differentiate for timber value	neutral in all but very marginal timber
Industry viability	recognized, but no explicit provision. Left to markets	same	same
Market sensitivity	Crown accepted 87% of risk and reward in good markets, but 0% in weak markets	Crown accepted 15% of risk and reward, increasing to 89% in extreme	Crown accepted 15% of risk and reward in all markets, except 0% on very marginal timber
Predictability	inherently predictable	inherently predictable	inherently predictable, but affected by "waterbed"
Integrity	Criticized by industry for technical weaknesses	effectively a sales tax, unrelated to economic principles	retains same features as Rothery, except in division between profit and stumpage

"FAIRNESS" OF THE CVP AT THE CONCEPTUAL LEVEL

The export tax was levied on top of Rothery system stumpage, but the magnitude of the export tax was such that Rothery stumpage would rarely exceed the statutory minimums. Thus the Export Tax/Rothery combination was essentially a sales tax which would not recognize differences in the value of the timber harvested, unless lumber prices reached very high levels. It therefore failed to provide equity among licensees on the basis of differences in timber quality and location.

The Rothery and CVP systems utilize the same base in determining stumpage, but differ in the division between stumpage and allowance for profit. In both cases, the total of stumpage and profit, called the conversion return, is calculated by:

Conversion return = Estimated Selling Price - Estimated Operating Cost

ROTHERY SYSTEM

Under the Rothery system, the profit allowance was approximately 13% of what is now called the Estimated Selling Price (ESP), and stumpage equalled conversion return less profit allowance, except that stumpage was constrained to a minimum rate that averaged about $1.25 per m^3 in the Interior.

Stumpage = ESP - EOC - Profit allowance
or
Stumpage = Conversion return - Profit allowance

If the conversion return fell below the sum of 13% of ESP plus the minimum stumpage rate, then stumpage was charged at the minimum rate and profit allowance became whatever remained.

Profit allowance = Conversion return - Stumpage minimum

Thus, profit allowance could be less than 13% of ESP, and even negative. Actual profits would differ from the profit allowance if the specific operator

was able to exceed the ESP or to better the EOC, or if there were discrepancies between the ESP used in the appraisal and actual product prices.

CVP SYSTEM

Under the CVP system, the estimated conversion return, now called the Value Index, is apportioned among the Crown and the licensee on the basis that the target stumpage rate established in accordance with the Addendum must be attained, and whatever is left over is available for profit. In order to provide equity among licensees, the difference between the Value Index on the specific cutting permit and the average for all cutting permits (Mean Value Index) is added to the base rate, i.e. the target rate of the Addendum, trended by the StatCan price index, and adjusted for certain other pricing considerations.

Stumpage = Base rate + (Value Index - Mean Value index)

re-arranging the sequence, the equation becomes

Value Index - Stumpage = Mean Value Index - Base Rate

but Value Index, or Conversion Return, less Stumpage also equals Profit allowance, so:

Profit Allowance = Mean Value Index - Base Rate

CONCLUSIONS

This final equation demonstrates that, conceptually, **THE PROFIT ALLOWANCE FOR ALL OPERATORS IN THE INTERIOR IS THE SAME REGARDLESS OF TIMBER QUALITY, AND EQUALS THE DIFFERENCE BETWEEN THE AVERAGE CONVERSION RETURN, OR VALUE INDEX, AND THE BASE RATE OR AVERAGE STUMPAGE RATE.**

Individual licensees may achieve better or worse results, depending on their efficiency at logging or milling, and whether they do better or worse than the Average Market Value in their product sales. However, **ALL LICENSEES HAVE AN EQUAL OPPORTUNITY FOR PROFIT, INDEPENDENT OF THE QUALITY AND LOCATION OF THE TIMBER HARVESTED. COMPETITION IS NOW ON THE BASIS OF EFFICIENCY, NOT ON WHO HARVESTS THE BEST OR MOST ACCESSIBLE TIMBER.**

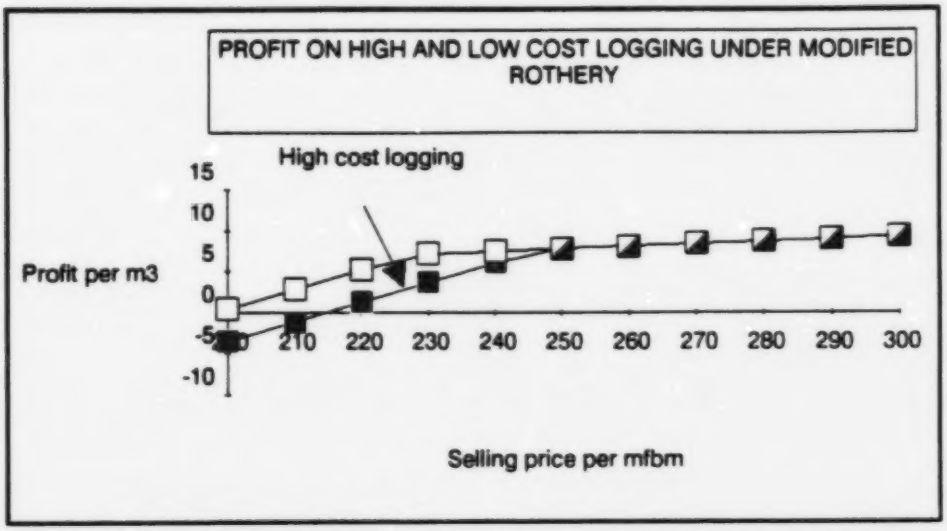
Marginal timber does not present equal profit opportunity when appraised below minimums, but the incidence of this is much reduced from under the Rothery system.

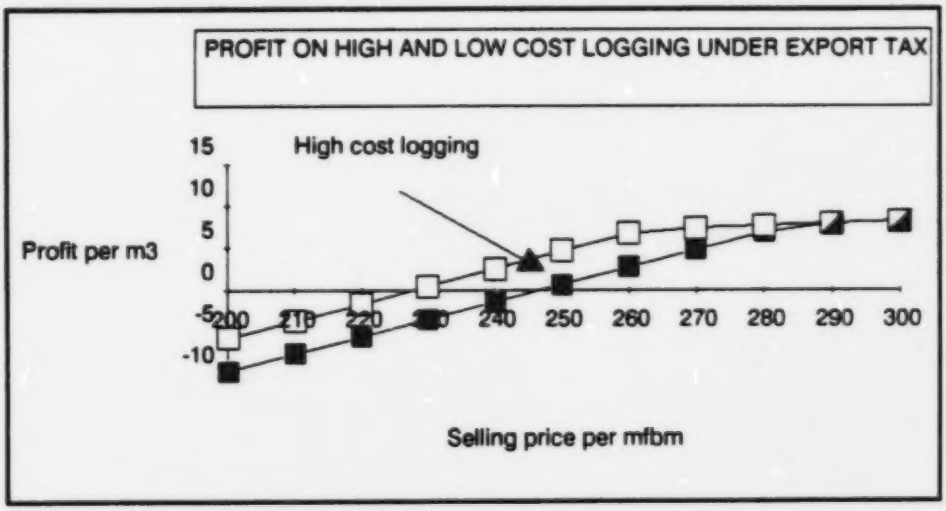
The greater fairness of the CVP compared to the Rothery or Export Tax systems is demonstrated by the graphs on the following page, which depict the profit potential of two hypothetical operators, identical but for the cost of delivering logs, at differing price levels.

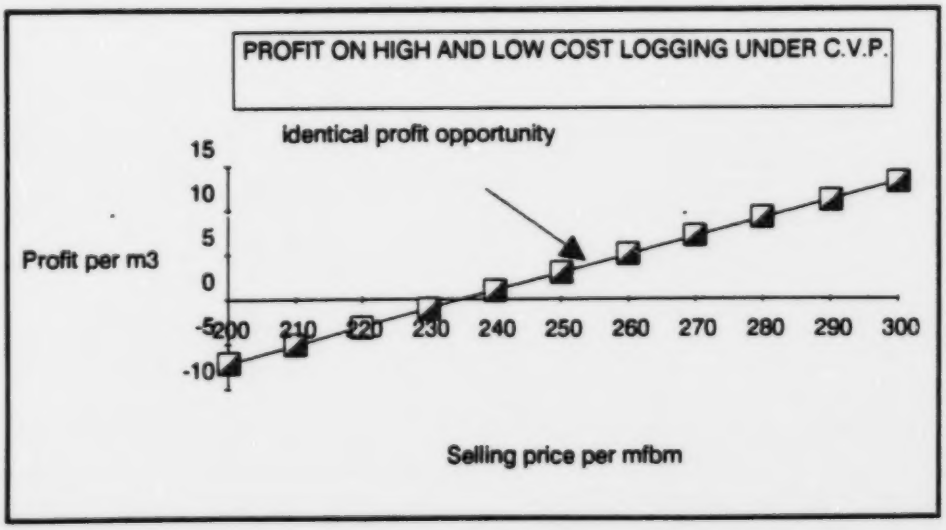
From the mathematical analysis of the CVP model, and the graphical depiction of the results, **THE COMPARATIVE VALUE PRICING SYSTEM CLEARLY HAS THE POTENTIAL TO BE MORE "FAIR" THAN EITHER OF ITS PREDECESSORS.** Whether it achieves this potential or not depends, as it did with the Rothery system, on the quality of the estimates and data used to determine Estimated Selling Prices, and Milling and Logging Cost Estimates, and on adherence to the basic principles of the CVP system.

PROFIT POTENTIAL UNDER STUMPAGE SYSTEMS

Identical Operations Except For Log Hauling Costs







TESTS OF THE SYSTEM

Several approaches were used to attempt to assess the fairness of the system in practice. These included: analysis of interviews and reviews of correspondence, and of submissions and analysis done by others; analysis of actual stumpage and profit data of a sampling of mills, masked for confidentiality; and, comparison of the distribution of current stumpage rates with the distribution found when stumpage rates were last significantly above minimum rates.

INTERVIEWS AND REVIEW OF CORRESPONDENCE

A review of the MoF's correspondence files of complaints about stumpage under the CVP, and a series of interviews with licensees, indicated problems at various levels:

Interviews: the CVP concept - Many licensees liked the "level playing field" effect of the CVP, while objecting to the overall financial burden imposed on their operations. Nearly all objected to the waterbed effect inherent in the system, as an impediment to necessary change, and a risk to their financial health.

Interviews: Policies under the CVP - Appraisal policies, as distinct from technical details or cost allowances, were broadly perceived as unfair. Most frequently mentioned was the "half-cap" whereby stumpage billed increases by only 50% of the increment by which the appraised rate exceeds $14.00 per m^3. Proposed changes in the point of appraisal, and concern that the "Stud concession" will not end in September 1990, elicited similar expressions of concern about special treatment of some, at cost to others because of the waterbed effect.

Interviews: Technical appraisal details - A wide array of complaints about inadequate cost estimates or inadequacies in selling price data was received. Much of the problem stems from the delay in updating logging cost estimates, which are currently based on 1984-1985 survey data, trended forward. Many of the most serious complaints came from licensees operating in "fringe" areas, where data sampling in past has been limited or non-existent, resulting in

either no specific estimates, or low or unreliable cost estimates. These are cases where there are either few operations available to be sampled, or the old data base does not reflect changes in operating areas or methods which have occurred in the past 5 years.

Interviews: Minority view

One significant minority group felt that it had been discriminated against in some fashion by the system, and presented comparisons of appraised stumpage of the same stand of timber, as if located in different regions of the province. This material was closely reviewed and is dealt with in the following section of this report.

COMMENTARY

The review reached the following conclusions with respect to the information from the interviews and submissions:

Comment: the CVP Concept - Our review has concluded that the system is fair in principle, as explained earlier in this report. The level of charges is outside the terms of reference of this review, and the waterbed effect is an unavoidable consequence of the MOU and the Addendum. There was no waterbed effect under the Export Tax system, but that system lacked fairness among licensees.

Comment: CVP Policies - The complaints regarding some of the policies associated with the application of the CVP are legitimate, as some of these policies compromise the performance of the CVP in permitting equal opportunity for profit. These are reviewed later in this report.

Comment: Technical appraisal details - The problems with the technical details of the appraisal system reflect the difficulty of estimating costs in an industry that has grown increasingly diverse in recent years, and will continue to do so at an accelerating pace. The short term solution seems to be more data, more current data, more staff and more expense, although the update to reflect 1988 - 1989 data will end some of the shortcomings.

In the longer term, detailed appraisals which attempt to consider the increasing complexity of the industry may well become unmanageable, and it may be more appropriate to move toward simplicity by developing an integrated model aimed at determining relative timber values. Under the CVP, only relative differences in timber value are needed to ensure equity among licensees in attaining the target average stumpage rate, which is determined by formula from a price index.

Technical details of the appraisal process are the same under the CVP as they were under the Rothery and Export Tax regimes. These details were less important under the predecessor systems which imposed a lower overall cost and were much less sensitive to differences in timber value. Under the CVP, shortcomings in the technical details of the appraisal process would not matter if they affected all operators equally, i.e. if both the Mean Value Index and the Value Index on an individual Cutting Permit are affected equally, then the stumpage charged on the Cutting Permit is the same as if there were no technical shortcomings. If any shortcomings do not affect all operators equally, or there are no other compensating errors, then this may introduce randomly occurring inequities between licensees.

It is not possible within the time permitted for this review to investigate the merits of the complaints about appraisal details, nor is it properly within the scope of a review of the CVP system, since the problems are not unique to the CVP, and existed under the predecessor systems. A listing of and commentary on these items will however be submitted as a separate addendum to this review.

Comment: the Minority view - The comments and submissions of the significant minority which felt discriminated against were examined closely. Most of the points made have been considered along with those made by others, in the appropriate sections of this report. Separate discussion is warranted regarding the comparisons which showed that a stand of spruce located east of Prince George would be appraised at higher stumpage rates there than if the same stand of timber were located in other parts of the Province.

Our review of the comparisons found that the differences in the appraised stumpage rates were attributable to several appraisal elements, as set out below in order of descending importance:

Estimated Selling Price

The largest single source of differences was in the AMV for lumber. If identical AMVs were used in all cases, then stumpage would have been higher in the Peace zone than in Prince George; and at the same level if appraised using the Cariboo appraisal zone equations, and a milling cost estimate appropriate to a Quesnel mill. In the latter instance, this conclusion was reached after adjusting for an erroneous hauling cost estimate, not applicable to the same timber or terrain types.

AMVs are collected regularly on a regional basis, and reflect very real differences in the value of the product outturn due to timber quality and size, from one area to another. If anything, the weakness of the AMV data is that they do not adequately reflect the full spectrum of value differences. This is dealt with at length subsequently in this review under the heading "AMV DETERMINATION". Until a more sensitive method is developed, regional AMVs are one reasonable way to recognize a very real price differential.

A small differential existed in chip AMVs in the comparisons, due to higher transportation costs from some of the other areas to the more distant pulp mills.

The differences in stumpage due to AMV, as found in the comparisons, reflect reality, and are not inherently unfair.

Milling Cost Estimates

The second largest source of differences occurred where the Southern Interior Milling Cost Zone was used for comparison. Milling costs apparently are higher in the Southern Interior for a variety of reasons, relating in large part to the timber base and perhaps to product mix, although the broad dispersal of the mills may also affect service costs. Although milling cost estimates in the appraisals are varied for species

and decay, they are not able to reflect the higher cost of milling small timber, nor the cost of milling sound spruce logs in a mill designed for decadent cedar and hemlock. While there is considerable scope for improving the method and basis for estimating milling costs, at present the only way of recognizing these real differences is through the existence of a separate milling cost zone.

Logging Cost Estimates

Regional logging cost equations produced negligible differences in cost estimates, once the inapplicable hauling cost estimates were corrected. (One inter-regional comparison supplied by others showed a more notable differential). Logging cost equations have been developed on a regional basis to improve the predictability of the equations. A single set of equations for all zones produced poor predictability because of the large number of unmeasured variables which impact on costs. There is no discrimination inherent in using the equations which provide the best predictability. It would be discriminatory to use equations which are known to provide unreliable estimates under particular circumstances.

Comparison with the coast

Adjustments for differences between the coast and interior may be impossible to make with any degree of confidence. The coast industry is geared to a different type of log and different lumber markets, so it is unlikely that the Vancouver log market would value a spruce log the same as in Prince George. Nor could the cost of logging in snow in Prince George be compared to the cost of logging in the rain on the coast with validity or certainty. While this comparison yielded a huge value differential, a mirror situation would likely occur if large, high grade hemlock logs from the coast were appraised in Prince George.

In short, most of the differences in the appraised stumpage result from real differences in operating costs or product mix, and are not considered to be discriminatory. The derivation or zoning of some of the costs certainly could be improved, but that could work for or against the conclusions drawn from the comparisons.

ANALYSIS OF CHANGES TO COSTS AND PROFIT

To assist in this review, Price Waterhouse Associates was commissioned to provide delivered log costs, stumpage charges, forest renewal expenses and operating profits, all on a per cubic metre basis for each year, 1986 through 1988, for each of a sample of mills grouped by type of mill and biogeoclimatic zone. Individual mills were not identified, and all data were to remain confidential and be returned to Price Waterhouse on completion of this review.

Changes in the costs and profitability of each mill from 1986 under the Rothery system, through 1987 under the Export Tax system, and 1988 under the CVP, were examined to see if the changes were consistent with a fair distribution of stumpage charges. A more equitable distribution would increase stumpage most on timber with the lowest delivered cost, within the same biogeoclimatic zone, if species and quality were identical. If the operation of the CVP is consistent with its design, then the variation in profitability should lessen as timber charges become more equitable, leaving only efficiency differences as a source of variation. This assumes that operations otherwise were stable over the period examined. Unfortunately this was not the case, as companies changed operations in response to the evolving stumpage systems.

There were numerous other distorting factors during 1986-1988: strikes at some mills in 1986, modernizations and rebuilds, divergent trends in log costs due to changes in operating area, and the impact of salvage of beetle-killed timber on production levels and mill costs (evident in sharp changes in the margin available for logs, stumpage and profit). Differences in operator efficiency (shown by the fact that some of the most profitable operators were those with the highest total cost of logs) created additional "noise" in the data.

<u>Within Groups</u> - The result of this "noise" was that within the groups, stumpage did show greater variability than before, as would be expected, but the greatest increases were sometimes on the most costly logs. There are a variety of possible explanations for this including operator inefficiency, differences between the point of appraisal and actual point of use, or simply that the most expensive logs to produce may also have been the most valuable.

Although the CVP should create equal opportunity for profit among operators, the variability between mills actually increased. There were many instances where the changes for an individual mill over the three years was consistent with expectations, but there was too much random variation within most of the groups to draw any firm conclusions.

It is worth noting that the data showed wide differences in efficiency within all groups. This suggests that differences in the average profitability of groups prior to the introduction of the CVP, when most stumpage was at minimum rates, had more to do with timber values, rather than any one group being composed entirely of efficient operators.

Among Groups - Comparisons among groups, where the effects of random noise tend to be lessened in the averaging of group data, conform to the expectations of the CVP system. As shown in the accompanying table, stumpage increased from levels at or close to minimums on all timber types, by varying amounts, in accordance with general perceptions as to which timber is the most valuable. Perhaps more important, the change in profitability and the reduced variability between regions, i.e. the lower standard deviation for profit among groups in 1988 than in previous years, indicates that the increase in stumpage has been borne by operators with the highest valued timber.

Since each group contains both efficient and inefficient operators, the complaint that efficient operators have been "penalized" has no credibility. The system does not discriminate between efficient and inefficient operators, but only reflects differences in the value of timber. It is probable that some operators are not being treated fairly as a result of shortcomings in the technical aspects of the appraisal, and some of the policies affecting the CVP do create distortions. However, as a broad measure, the CVP accomplishes its objective of recognizing the diversity of the forest resource and the variability in operating costs and product values, in establishing the value of a stand of timber.

CHANGES TO STUMPAGE AND PROFITS PER CUBIC METRE WITH INTRODUCTION OF CVP

COMPARISONS AMONG SAWMILL GROUPINGS												
		STUMPAGE						PROFIT PER M3				
		AVERAGE			STD DEV			AVERAGE			STD DEV	
GROUP	TYPE	1986	1987	1988	1986	1987	1988	1986	1987	1988	1986	1987	1988
ONE	STUD	na	1.91	5.08	na	0.66	3.43	na	1.27	3.06	na	3.87	2.06
TWO	SPRUCE-PINE	1.32	2.57	6.03	0.40	1.05	2.83	6.37	7.96	3.92	8.05	4.17	8.93
THREE	NE & PG WEST	1.43	2.87	7.15	0.31	1.26	3.36	10.34	12.61	4.25	6.42	5.30	7.54
FOUR	EAST SIDE PG	1.78	3.63	13.52	0.18	0.70	2.68	12.14	13.48	4.20	6.54	6.10	7.95
FIVE	DRY FIR BELT	1.34	3.04	5.94	0.31	0.85	2.02	5.38	6.16	2.60	5.67	4.99	5.43
SIX	WET BELT	1.62	3.09	5.78	0.48	0.90	2.52	4.78	5.74	1.53	4.67	5.21	6.38
GROUP AVERAGES		1.50	3.04	7.68	0.20	0.58	3.14	7.80	9.19	3.30	3.25	4.58	1.07

STD DEV = standard deviation

Profit is operating profit before interest and taxes

Source: prepared from data obtained from Price Waterhouse Associates

HISTORICAL EVIDENCE

During most of the 1980s, most of the timber in the Interior of British Columbia appraised at or below the prescribed minimum rates, so there was little difference in stumpage rates between species and regions. Significant stumpage differentials last occurred in 1979, when a substantial portion of the harvest was appraised above minimums.

Since then there have been many changes in the industry and in the types of timber and areas being harvested, but the comparison in the accompanying table of stumpage rates in 1979 with those of January 1990, indicates remarkable similarities in relative valuations.

Where significant differences from 1979 do occur, they are related to factors such as the currently depressed market for cedar lumber, or to the impact of beetle-killed salvage on timber values. Clearly the pattern of stumpage rates under the CVP is similar to what would have been generated under Rothery in those periods when most timber was appraised above minimums.

COMPARISON OF 1979 AND 1990 STUMPAGE RATES

(Average rates on TSHLs for 1979)
(January 1990 average on all active Cutting Permits, before stand as a whole and half-cap)

SPECIES	CARIBOO		KAMLOOPS		NELSON		PR. GEORGE		PR. RUPERT	
	1979	1990	1979	1990	1979	1990	1979	1990	1979	1990
BALSAM	4.11	0.25	3.12	0.25	1.54	0.25	3.56	2.19	5.31	5.73
WESTERN RED CEDAR	3.20	0.25	17.11	0.32	16.49	2.53	6.02	0.25	12.13	6.30
DOUGLAS FIR	12.65	12.47	13.61	11.49	8.69	10.31	15.71	15.85		
WESTERN HEMLOCK	1.12	0.25	1.14	0.25	0.34	0.25	0.86	0.25	1.34	0.25
WESTERN LARCH			12.62	13.27	12.68	12.13	2.00			
SPRUCE	10.54	12.60	9.07	14.43	5.56	13.43	9.02	16.32	6.73	18.14
WHITE PINE	nil	nil	32.22	31.96	31.71	31.07		27.19		
LODGEPOLE PINE excl Alexis Creek	3.66	1.69 5.03	4.25	4.26	1.93	4.41	4.43	8.57	4.86	8.72
ALL SPECIES excl Alexis Creek	7.03	4.88 7.25	8.14	7.26	6.94	6.70	7.11	11.45	5.48	7.98

excl Alexis Creek - average for the entire region excluding the deep negative Value Index on lodgepole pine in the Alexis Creek TSA

Source: MoF

APPRAISAL POLICIES UNDER THE CVP

This review has found that the principles of the CVP system are fair, and that the actual charges are borne equitably at least in broad terms. There are some aspects of an "administrative policy" nature which may distort the fairness. Some of these have been ongoing problems under the previous Rothery system, while some have evolved with the CVP, and some may have been introduced as temporary compensation for inadequacies in the technical data base. Other aspects are, as yet, only suggestions that have been made as proposed modifications to existing policies, by one group or another. The major "policy" issues discovered during this examination and the interviews, are listed and reviewed below.

THE STUMPAGE HALF-CAP

In 1988 the MoF introduced a cap policy on stumpage rates in which only half of any increase in the appraised stumpage rate above \$14.00 per m^3 was charged to the licensee. This apparently was introduced out of concern that errors in the technical data base were generating excessive stumpage charges. The reduction in stumpage rates for one group was then passed on to the remaining licensees as increased charges, through the "waterbed" effect.

There is no justification in principle for a cap in the CVP system, as it creates greater opportunity for profit for some than for others. If the technical data base is inadequate, then the proper remedy is to improve the appraisal data. Some have suggested that the problem might lie in the use of incorrect Lumber Recovery Factors (LRFs) in the appraisal of large logs. The LRF factors are generally conceded to be on weak ground, but the average LRF used in appraisals is adjusted to coincide with the industry average. LRFs have recently been reduced on large logs and increased on small logs, yet the cap remains.

The cap is an inequitable shifting of the burden from one group to another. If no technical reasons can be found to show why appraised stumpages are "too high" relative to others, then the cap should be eliminated when the 1988-1989 cost data is incorporated into appraisals.

THE WATERBED EFFECT

Virtually every licensee decried the waterbed effect (explained earlier in this review) as an impediment to changes in the appraisal system, which is so. This review sees no way of eliminating the waterbed except for a return to the Export Tax system. That system failed to reflect the primary objectives for timber pricing, and the CVP with its waterbed is still more equitable than either of its predecessor systems.

STUMPAGE MINIMUMS

A \$0.25 per m^3 rate is established as the lowest price for which the Crown will sell standing timber. To be perfectly equitable among licensees, there should be neither minimums, which charge more than the timber is worth, nor maximums, which charge less than it is worth. In practice, some minimum rate should be expected, to reflect costs of making the sale, opportunity costs, etc. The \$0.25 rate is "more fair" than a higher rate, although the setting of minimums has little to do with fairness among licensees, and more to do with the trade-offs between direct and indirect revenue generation for the Crown.

AVERAGING NEGATIVE AND POSITIVE STUMPAGES

Stumpage is appraised for the stand as a whole for the entire Cutting Permit, so that negative and positive values on individual trees are averaged. Some licensees would like this averaging effect to apply over still larger areas, as large as the whole Timber Supply Area (TSA). Doing so would reduce stumpage for those in marginal timber and increase it for those in better timber. It might also affect the definition of operability, and thereby the magnitude of the annual harvest. The most important consideration however is that the Cutting Permits be of manageable size so that the Crown is able to make accurate appraisals of the value of the timber, at the time of harvest. In this instance, fairness lies in all licensees being subject to consistent administrative policies, which exist independently of the valuation system.

POINT OF APPRAISAL

The policy of appraising timber to the sawmill which produces the highest value for the timber, i.e., due to the lowest delivery cost, has long been a point of contention. This is especially so in recent years when operators

were directed into distant areas to harvest beetle-damaged timber, only to have the timber appraised to some mill near the timber which was unable to utilize the full salvage volume.

In other cases, timber that existing mills have been unable to mill, which is now being harvested by others, is being appraised to those mills which cannot use it, as in the case of stud logs being appraised to dimension mills. In some cases the resulting difference in stumpage exceeds a "normal" profit margin on the lumber.

In still other cases the timber is consumed at the point of appraisal, but that mill incurs additional costs associated with its location which are not recognized in the appraisal.

To address some of these issues, the MoF proposed a new point of appraisal policy in 1988, of appraising to the nearest population centre. This concept has the advantage of potentially eliminating the need to recognize a "remoteness" cost on a mill-by-mill basis, or to develop different points of appraisal for different types of timber in an area. The 1988 proposal was opposed and never implemented. As it proposed using only those mills located on rail as points of appraisal, it has recently become obsolete due to rail abandonment in some areas.

Point of appraisal has a significant impact in the equitable treatment of licensees, and should be re-examined. This review has received many suggestions that the system should be improved, but there is no consensus recommendation. The choices seem to be: keep the present points and refine the cost estimates; use the population centre concept; or, appraise to the mill of consumption. There is no clearly preferable alternative which will improve on the current situation, for all concerned. This review finds the population centre concept preferable and appealing in its simplicity, <u>if</u> the appropriate centres can be determined by objective measures, and the policy can be applied fairly in all regions. The alternative is increasing complexities and detail in order to provide more equitable appraisal estimates.

IMPACT ON OTHER PRODUCTS (e.g. PLYWOOD)

Plywood producers, who escaped the effects of the export tax since little of their product is sold in the U.S.A., have suffered from the increase in stumpage charges, but so did sawmills who shipped significant amounts of their product offshore. The policy of appraising the timber and not the actual use to which it is put is one of long standing, and it would be unfair to lumber producers, and a policy reversal for the MoF, to sell the same quality of timber at a lower price to another user. The introduction of the CVP raised the costs of timber for these producers of products other than lumber, but under the CVP, the treatment they receive is as fair as to any other licensee. If the consequences of higher timber costs for these other users are a matter of public concern, that is properly dealt with as an element of industrial or social policy, and not through the timber pricing system.

STUD APPRAISAL CONCESSION

Because of the lower AMV of stud lumber compared to random lengths, the MoF in 1980 began appraising all logs consumed by stud mills using stud AMVs, regardless of log size or suitability. A split appraisal was used in the case of combined stud/dimension or stud/veneer mills. In 1988, the MoF announced a new policy whereby 5 metre logs below a 20 cm. top diameter would be appraised as stud logs, and larger logs as dimension, with a pro-ration on mixed stands. Stud mills would be given until September 1990 to prepare for the change. Stud mills which use a high proportion of large logs would then be adversely affected by the higher AMVs of dimension lumber. Most operators supported this policy, which is consistent with appraising the timber to its highest potential regardless of actual use. The operators which will be most affected by this change oppose it.

The arguments on one side are that the rules have changed since the mills were built, and on the other that the continuation of the concession is inequitable, and the industry must eventually adapt to changing times.

This review recommends that the concession end as scheduled. The disadvantage of the stud mills should be ameliorated if the accompanying recommendation on AMV determination is implemented.

AMV DETERMINATION

The present system for determining lumber AMVs uses zonal averages where the zones correspond to the rail systems. The MoF has recently made some changes to recognize the costs of getting lumber to rail, now that rail abandonment is a factor, but there may still be unrecognized transportation cost differentials hidden in the averages, for producers in the same zone. Changes in point of appraisal policy could remedy the complexity of the current solution, and eliminate any unrecognized cost differentials.

A greater potential inequity may lie in the use of large AMV zones if producers in one part of it have smaller timber, and are unable to attain the same average prices as competitors in another part of the zone with larger timber. The price spread between 2x10 and wider lumber (wides) and 2x4 to 2x8 lumber (narrows) may be as much as $100 per mfbm. Several licensees and groups commented on the failure to recognize the effect of log size on product value. This issue represents a potentially major defect of the appraisal system, one which has been increasing over the past decade with the growth in the price spreads between wides and narrows. The topic is dealt with at length subsequently under the heading "LINKAGES"

Freight and weight adjustments to AMVs were criticized by licensees as being both too low and too high. Rail deregulation, confidential contracts, freight rebates and the growth of truck shipments have made it difficult for the MoF to obtain accurate freight rates to make these adjustments. It also makes it impossible to determine within the time allotted for this review, whether these adjustments produce any inequities.

The majority of interviewees objected to the exclusion from the AMV calculation of export grades and ALS/CLS grades of lumber shipped offshore. MoF staff indicate that only non-ALS/CLS grades are excluded. Non-ALS/CLS grades have been excluded only because of the difficulty of finding an acceptable volume conversion factor, as the conversion varies for different sizes of lumber. In addition to that, LRFs are frequently lower on product for the offshore markets, due to more stringent standards for decay and wane. Exclusion of the high grade lumber component can be unfair because it may reduce the AMV in one region and thereby adversely affect the stumpage of

others, but it is not clear that the complexity of the proposed solution is warranted by the benefits. An alternate solution could be to assign a proxy price to the excluded volume, using appropriate domestic market prices, in order to minimize the distortion of the AMVs, without engendering additional complexity and effort. In the longer term the modelling approach suggested under "LINKAGES" might resolve the problem.

CHIP PRICING

There were numerous complaints about the method the MoF uses to determine chip AMVs. These complaints pale beside the problems being created by falling prices for certain pulp and paper grades, while other grades remain more stable. As new pulping capacity around the world comes onstream over the next few years, old pulp pricing relationships may deteriorate still further, producing greater chip price differentials than in the past. Pricing of Fibreco chips in the chip AMV is also difficult, since the price paid to Fibreco member sawmills can be affected under the terms of the financing of the Fibreco pulp mill. Once any discount is applied, these become non-arms-length transactions, and should be excluded from the database, as with chips from integrated mills. Alternatively, if the discount can be determined, it should be added back into the chip price. (Declining CTMP prices might lead to lower prices than for chips sold to kraft mills, depending on mill location.) This review can only recommend that the MoF adapt to the changing circumstances, without altering the fundamental fairness of the CVP system.

Numerous independents complained that the integrated sawmills had a competitive advantage because they could sell a higher percentage of their chips, and this should be reflected in a higher AMV for integrated sawmills. For the MoF to do so would be counter to the long-standing policy of using representative cost and revenue estimates, rather than those of the mill being appraised. Moreover, if such a new policy were applied consistently, it would also include in a mill's "own AMV" higher sales returns for sawmills which installed remanufacturing facilities to recover value from low grade lumber, or cogeneration facilities to get better prices for hog fuel, or particleboard of fibreboard plants to obtain value from chips. Each of these can convey a competitive advantage to the sawmill which takes the risk. The CVP created equal opportunity for profit, independent of timber quality. This proposal

would lessen the fundamental fairness of the CVP system, which is supposed to appraise the timber, independently of the user.

ONE ZONE FOR APPRAISAL ALLOWANCES

Some operators recommended only one zone be recognized for milling cost and overhead estimates. This review finds that there are sound reasons why there should be differences in the cost of these elements, which are reflected in the MoF cost surveys. However, there is no good reason, other than chance, that the costs should be the same for all operators within the zones, given the wide diversity of conditions within the zones. Rather than eliminate the two zone system, which in the past has been supported by actual cost data, this review recommends that those factors which contribute to the higher costs be examined. If relationships can be determined, they should be applied throughout the Interior, as some of the causes of the higher costs seem to be spreading to other regions. (The Section on "Linkages" deals with this at greater length). Until these relationships have been determined, or until the latest cost surveys fail to support the zonal concept, then it should be retained.

LINKAGES

Under the Rothery appraisal system, cost allowances were developed from pools of data which often had inconsistent bases. While there have been improvements over the years, most licensees still believe that appraisals would be much improved if they relied on linkages from the timber cruised through to the value of the end product, and on consistent data pools, rather than by summing averages from unrelated pools of cost elements. The classic example of unrelated pools is the inclusion of high valued products from a mill in determining AMVs, but excluding the mill from the milling cost survey, because the extra costs incurred to realize higher product values made it "inefficient". This obvious inconsistency no longer exists, but others remain.

These linkages would recognize that "the timber drives the mill". Different species, decay and log sizes require different mill configurations. The greater the variety of sizes and species a mill has to contend with, the less efficient it will likely be on any single species. Thus biogeoclimatic zone,

or number of zones which comprise the local timber supply, will affect milling costs. Volume of timber tributary to the point of appraisal determines if milling costs can be reduced by trading logs to better suited facilities.

Smaller logs not only yield generally lower LRFs, but lead to higher milling costs than larger logs of comparable quality. They may also yield lower average selling prices. The preceding section on lumber AMVs noted the possible differences between mills in average sales values due to log size, which has the potential of being the largest single error source in the whole appraisal system. Yet the impact of log size on milling cost and lumber values for dimension lumber mills goes unrecognized, except as it is picked up by the use of regional data. Stud based appraisals are the one instance where the value and recovery differences are recognized, but this applies only to one end of a very broad spectrum, and not to all of the logs consumed by stud mills.

If the proposed linkages produced AMVs which reflected differences in timber size, then the impact on stud mills of the end of the stud concession probably would be lessened.

The proposals for updating LRFs included the use of regression analysis on actual recoveries, or alternatively, utilization of computerized log scanning and sawing to estimate more accurately the potential LRFs from a cruise-based log distribution. Emulation of the breakdown and recovery programs used in sawmills would also provide reasonable estimates of lumber outturn by size, which could then be used to reflect the price spreads between wides and narrows. The proposal is worthy of examination as the quality of appraisals would probably benefit from an integrated approach to determining value. The CVP is especially amenable to this, as it requires only an index of relative value, not a precise determination of actual value. This review recommends the linked approach as a method of improving the fairness of the CVP through more accurate appraisals. A model of the relevant linkages may also offer the only solution to coping with accelerating rates of change and differentiation in the lumber sector.